

WHAT IS CLAIMED IS:

1. An isolated nucleic acid comprising a reading frame comprising a first sequence, wherein said first sequence encodes one or more segments of tumor-associated antigen SSX-2 (SEQ ID NO: 40), wherein the first sequence does not encode the complete SSX-2 antigen, and wherein each segment comprises an epitope cluster, said cluster comprising or encoding at least two amino acid sequences having a known or predicted affinity for a same MHC receptor peptide binding cleft.

2. The nucleic acid of claim 1, wherein said epitope cluster is chosen from the group consisting of amino acids 5-28, 16-28, 41-65, 57-67, 99-114, 167-180, and 167-183 of SSX-2.

3. The nucleic acid of claim 1, wherein said one or more segments consist of said epitope cluster.

4. The nucleic acid of claim 1, wherein said first sequence encodes a fragment of SSX-2.

5. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 90% of the length of SSX-2.

6. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 80% of the length of SSX-2.

7. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 60% of the length of SSX-2.

8. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 50% of the length of SSX-2.

9. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 25% of the length of SSX-2.

10. The nucleic acid of claim 4, wherein said encoded fragment consists of a polypeptide having a length, wherein the length of the polypeptide is less than about 10% of the length of SSX-2.

11. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of amino acids 5-65, 5-67, or 5-114.

12. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of amino acids 16-65, 16-67, 16-114, 16-180, or 16-183.

13. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of amino acids 41-67, 41-114, 41-180, or 41-183.

14. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of amino acids 57-114, 57-180, or 57-183.

15. The nucleic acid of claim 4, wherein said encoded fragment consists essentially amino acids 99-180 or 99-183.

16. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of amino acids 16-183 of SSX-2.

17. The nucleic acid of claim 16, wherein said first sequence encodes exactly amino acids 15-183 of SSX-2.

18. The nucleic acid of claim 4, wherein said encoded fragment consists essentially of an amino acid sequence beginning at one of amino acids selected from the group consisting of 5, 16, 41, 57, and 99 of SSX-2, and ending at one of the amino acids selected from the group consisting of amino acid 65, 67, 114, 180, and 183 of SSX-2

19. The nucleic acid of claim 1, further comprising a second sequence, wherein the second sequence encodes essentially a housekeeping epitope.

20. The nucleic acid of claim 1, wherein said reading frame is operably linked to a promoter.

21. The nucleic acid of claim 19, wherein said first and second sequences constitute a single reading frame.

22. The nucleic acid of claim 21, wherein said reading frame is operably linked to a promoter.

23. An isolated polypeptide comprising the amino acid sequence encoded in said reading frame of claim 22.

24. An immunogenic composition comprising the nucleic acid of claim 22.

25. An immunogenic composition comprising the polypeptide of claim 23.